ISSUE 10 July - Sep 2006

pavan

A news bulletin from Centre for Wind Energy Technology, Chennai

C-WET

Contents

News ..... 2 C-WET at Work ..... 3 Wind Evacuation General Issue of Concern 4
Energetic turn of wind power ..... 5 Floating Ocean Windmills ..... 6 We Need Wind Power 7

Editorial

The need to produce energy by all possible means is beyond question or competition. However, fact remains that there exists a trade off among different sources. Wind power has, happily, made inroads in the energy mix. Critical mass has been established and we have overtaken the much hyped Nuclear power. It is time for introspection and to see to the next steps ahead. We have to ensure that the advantage derived from the enthusiastic responses is maintained. To this end, type certification is very important. It will not do to be merely competitive with in the field. The real trial is with other resources.

The process of type certification for a given model/machinery is to be understood in its correct perspective. In general, plant and machinery operating in public domain requires certification about their safe operating conditions. It could be a car or an aircraft or for that matter a thermal generating station. In these cases the certification happens before the product reaches market. Public may not even be aware of such requirements or that the products used by them have undergone this process.

The input output conditions in such cases are normally under good control and system design can take all factors into account. For example consider design of a thermal station. The amount of coal that gets into the system, the steam pressure, water quality, boiler & turbine design etc. are all pre-determined and provided for. Operational aspects are under control and designer can specify it. It is possible to ensure that none of the factors are exceeded in most of the situations.

Not so for wind turbines. There are far too many factors which are not under the control of the designer. On one hand the very nature of winds impose very heavy demands on the system design and optimization. On the other, being a product using many technologies, optimal integration requires considerable out-sourcing in terms of components and sub assemblies. With the competition in mind, designer tends to take considered views based on his or her experiences. Many of these decisions can have considerable impact on the model's ability to withstand the natural and manmade conditions of operation. Therefore it will always be a good idea, even if it is not a mandatory requirement, to have the product evaluated by a neutral agency.

Wind turbine certification systems followed in different countries have evolved over two decades. They have answers for most of the queries that may naturally come in the minds of seriously interested. When a model is type certified, three fundamental aspects are addressed. Firstly, the design evaluation goes into a thorough examination of all possible operating conditions and quantifies the fatigue loads; extreme loads etc. and determine the factors of safety and so on.

Design documentation, safety philosophy, structural dynamics, specifications etc. very carefully. Independent calculations are carried out to verify most of the critical assumptions. Detailed testing of the performance and structural loading forms the second important aspect of certification. The machine would also be subjected to most of the possible conditions of operation; emergency shut downs, fault situations. This helps in verification of design assumptions. For example, it will be possible to find out if the assumed stress levels in the blade roots are exceeded or under control. The third and equally important aspect is about ensuring that exact replicas of a given certified model are produced. To this end, the quality management system is studied carefully.

Even if type certification is not mandatory, the emphasis on the scientific aspects of certification cannot be over stated. It is always in the interest of the technology. Any designer will admit that, in the long run, such evaluation will give pointers for improving product design. Naturally this gives wind turbines undeniable competitive edge. This advantage should not be lost sight of.

M.P.Ramesh,
Executive Director

News

State – wise Wind Power Installed Capacity In India

State	As on 31.03.2005			As on 31.03.2006			Addition during 2005-06	Capacity addition during Apr'06 to Sep'06 In MW	Cumulative as on 30.09.06 In MW
	Demonstration Projects (MW)	Private Sector Projects (MW)	Total Capacity (MW)	Demonstration Projects (MW)	Private Sector Projects (MW)	Total Capacity (MW)	(MW)	(MW)	(MW)
Andhra Pradesh	5.4	115.1	120.5	5.4	115.6	121.0	0.5	0.0	121.00
Gujarat	17.3	236.2	253.5	17.3	320.8	338.1	84.6	37.5	375.6
Karnataka	7.1	403.7	410.8	7.1	577.5	584.6	173.8	102.9	687.5
Kerala	2.0	0.0	2.0	2.0	0.0	2.0	0.0	0.0	2.0
Madhya Pradesh	0.6	28.3	28.9	0.6	39.7	40.3	11.4	12.7	53.0
Maharashtra	8.4	447.8	456.2	8.4	992.9	1001.3	545.1	240.4	1241.7
Rajasthan	6.4	278.4	284.8	6.4	351.7	358.1	73.3	27.8	385.9
TamilNadu	19.4	2015.5	2034.9	19.4	2873.1	2892.5	857.6	255.6	3148.1
West Bengal	1.1	0.0	1.1	1.1	0.0	1.1			
Others	1.6	0.0	1.6	1.6	0.00	1.6	0.00	0.00	1.60
Total (All India)	**69.3**	**3525.0**	**3594.3**	**69.6**	**5271.0**	**5340.6**	**1746.3**	**677.4**	**6018.0**

Source : MNES

C-Wet at Work

DEVELOPMENT IN R&D UNIT

VALIDATION OF SODAR DATA WITH TALL EXISTING MET MAST AT KAYATHAR

Recently project team fromWRA and R&D units have conducted onsite experiment at Wind Turbine Test Station (WTTS) Kayathar using SCINTECH MFAS SODAR system so as to validate the wind profile measurements along with the existing 70-m height met mast. The SODAR was placed at a distance of about 200m with 261 deg fore bearing so as to ensure least disturbance of the acoustic receptions. 10-minute average data was collected for a period of about 12 days. The vertical wind profiles at 1000 m level is shown in fig 1 and time series of wind speed is shown in fig.2.

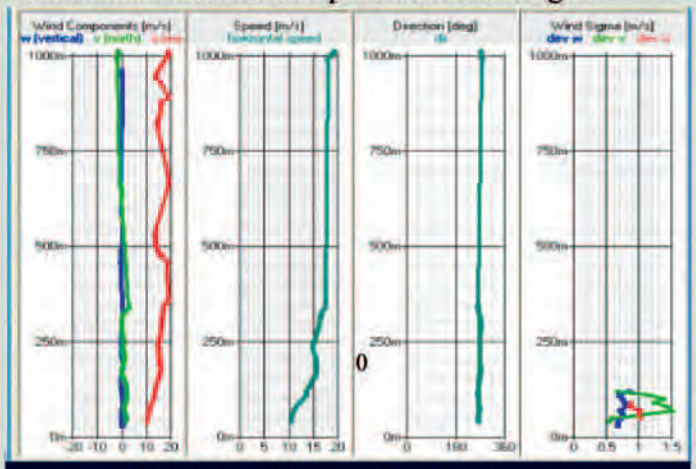


Fig.1 Vertical Wind Profile at 1000 M Levels

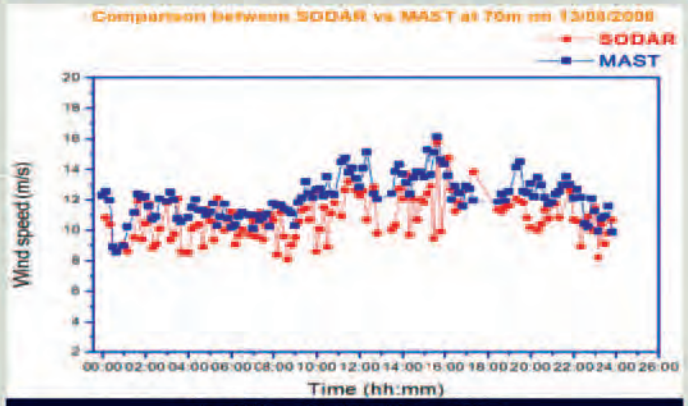


Fig.2 Time Vs Wind Speed Plot

MOVE ON IN WRA UNIT

MNES IS FUNDING FOR 50 NEW WIND MONITORING STATIONS

Presently, fifty two wind monitoring stations are operational under various wind monitoring projects such as Power Law Index (PLI) verification, Measure-Correlate-Predication (MCP) and National Wind Resource Assessment Programme including Northeast states.

CWET is operating four wind-monitoring stations for New and Renewable Source of Energy (NRSE) Division, Andaman & Nicobar Islands, Port Blair for the last two years. Wind power density at Mount Harriot is found to be 180 W/m2 at 30 m level.

Two wind monitoring stations have been established in Karnataka for M/s.Hutti Gold Mines Ltd. Bangalore and M/s MSPL Ltd., Hospet under the consultancy projects. Besides these, installations of two more wind-monitoring stations have been initiated one each at Hospet and Nilgiri for M/s MSPL Ltd and Hill Area Development Program (HADP), Tamilnadu respectively.

The Unit is verifying procedures followed by M/s Suzlon Energy Ltd, Pune for operating wind monitoring stations at five locations in various states as per their request.

Three micrositing/production estimation projects have been taken up for various developers viz. M/s Uniply Industries Ltd., Chennai, M/s Teledata Informatics Ltd., Chennai and M/s Tata Power Company Ltd, Mumbai under consultancy projects.

The Unit has completed pre feasibility study for detailed wind monitoring in Uttaranchal for Uttaranchal Renewable Energy Development Agency (UREDA), Dehradun and three micrositing studies for Tamilnadu Energy Development Agency (TEDA), Chennai.

STEPS FORWARD IN TESTING UNIT

The Power quality measurement and safety functional test for Suzlon 600kW was carried out (Low wind & High wind) during the month of July and September.

An agreement has been signed with M/s.Suzlon for 1500kW wind turbine during the month of August.
The working model has been fabricated and kept in the testing lab for analysis purpose.

Delphi software training Programme was organised by Testing unit and our staff members took part in it.

Shri R. Kumaravel scientist presented a Lecture on activity of " CWET and Wind Energy Technology" at the function conducted by society for Energy Engineers & Managers at Kanyakumari on 31st August 2006.

MARCHING AHEAD IN S&C UNIT

The agreement for the Provisional Type Certification (PTC) of Suzlon 1500 kW wind turbine under Category III as per TAPS-2000 has been signed with M/s. Suzlon Energy Limited on 24-07-2006.

.The agreements have been signed for the PTC of V27-225 kW Wind turbine model with M/s Vestas RRB India Limited on 23-08-2006 and for the PTC of T600-48 wind turbine model with M/s Elecon Engineering Company limited on 24-08-2006 under Category I as per TAPS-2000.

.The Site evaluation has been carried out at Gujarat for I29/250 kW wind turbine of M/s India WindPower Limited.

Revised List of Models and Manufacturers (RLMM) Committee meeting has been organised and the list dated 11-09-2006 has been issued.

Training course on Delphi 7 Programming was attended by all the staffs of S&C unit from 21-08-2006 to 26-08-2006.

The certification projects, taken up as per TAPS-2000, are under progress.

The continual improvement and maintaining the Quality Management System are on going.

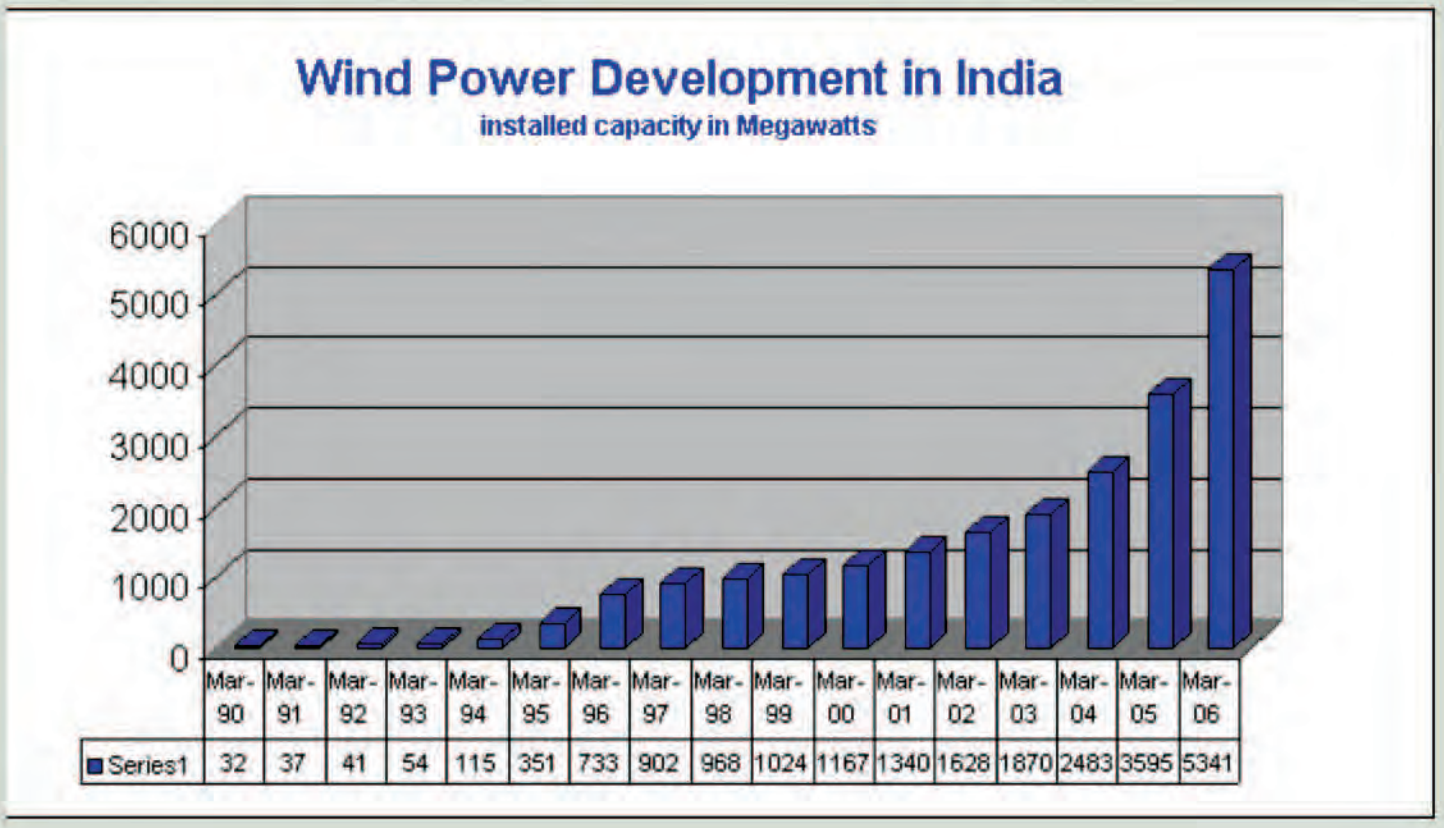
HIGHLIGHTS FORM ITCS UNIT

Self- explanatory Video film on C-WET

A fifteen minute self-explanatory / corporate video film on C-WET in Hindi & English has been prepared to highlights the achievements / activities & services of C-WET. Shri. Vilas Muttemwar, Minister, MNES has release the same on the occasion of the inaugural session of the Green Power 2006 on 13th July 2006 at Chennai Trade Centre, Chennai.

Upcoming National Training course

C-WET is organising Fourth national training course on "Wind Farm Development and Related Issue" on 9th & 10th November 2006 at M/s. Yashwantrao Chavan Academy of Development Administration, Raj Bhavan Complex, Baner Road, Pune 411 007, Chennai for the technical persons and field engineers in the wind power sector.



	Mar-90	Mar-91	Mar-92	Mar-93	Mar-94	Mar-95	Mar-96	Mar-97	Mar-98	Mar-99	Mar-00	Mar-01	Mar-02	Mar-03	Mar-04	Mar-05	Mar-06
Series1	32	37	41	54	115	351	733	902	968	1024	1167	1340	1628	1870	2483	3595	5341

Wind Power Evacuation General Issues of Concern

Common man who sees non-working turbine feels that wind power is more of hype but it does not work generally. Ignorance of people hides the fact that there has to be minimum wind speed to keep turbine working and also the turbine needs to be stopped for higher speed (gale, storm etc.) At the same time, the expectations of general public are not to be discarded. When power cannot be transferred even when it can generate, with adequate winds what else can be the cause? How can one know what is the reason behind the stoppage of group of machines? How one can believe that after putting so much efforts to set up a project, investing Crores of Rupees, the machines are generally forced to be kept idle because of rationing by the Electricity Boards. Some times, it is not able to take the power, even when it is available. Thanks to nature, wind power is not dependant on availability of coal, water in reservoir etc, but linked to the adequate evacuation infrastructure to be provided for the project.

One can agree for problem in evacuating wind power when the project is newly set up and there is a slow pace of the infrastructure development. But the investors and turbine manufacturers (developers) are quicker in their part of execution of the project. In such a case, once the support structure for evacuation is in place, this bottleneck is expected go. But it is difficult to get convinced, when the project has been in existence for some years, how is that power still can not be evacuated.

Yes the reasons can be many

Sometimes there can be a breakdown in the system and EB can ask developer to cooperate for a short duration.

It is interesting to note that sometimes the new projects or installations (additional capacity of wind power generation by new projects into the saturated system) cause rationing to all others who are already connected to the same network. It would be fair to ask first the new projects to be rationed and not forcing 'already' running projects developers to share the pain.

This type of situation invariably happens when there are good winds and turbines are ready to generate to full capacity (say near 100% PLF during these days). Even the rationing (switching off circuits) by EB is done on adhoc basis. Later the wind speeds can drop to such an extent that, what power otherwise could have been evacuated within the existing circuit limitations. Winds are unpredictable. Monitoring when to keep it off or on, like load dispatch center is also not so easy. The existing system may not ready for this.

In power shortage days, EB is importing power from outside the State, where as the easily available wind cannot be used to generate power to the extent what is possible. This decentralized wind power generation has a preference, these days when compared to importing of power from long distance, which is also subject to considerable transmission loss.

Another issue is planning and execution of Transmission and Distribution network expansion. It is generally done, up to the secondary evacuation substation, in line with the wind power project additions. But what gets ignored is reviewing or strengthening the capacity of EHV grid link, from this region. The capacity of generation can happen to be much more than the consumption of the region. Initially the line design would have been planned for the requirement of consumption (drawl of power) but today the evacuation of power due to large wind power projects in the region become problematic.

In Germany one has to manage the grid compatibility problem, as it is almost now 20-30% of total generation, is from wind where as in India we have hardly any penetration. So to ensure better grid stability in Germany and other European countries, with such large quantum of wind power as the source for the National Grid, there has been move to demand the specifications of new wind turbines. These are designed to be more stable. Even in case of un-stability of connecting transmission links, turbines are expected to take care. In fact, these days, turbines have to continue to run when the grid fails and machines are not stopped. Of course the power is not generated but turbines can start pumping sooner the grid is restored.

The effect of wind power on grid has also another interesting feature. When the wind power is evacuated over long distance through the State Utility transmission lines and load dispatch centers, the grid voltage due to the capacitance effect shall increase beyond safe limits. There are instances where the wind power feeder is switched off to reduce the generation input and thus voltage is brought to normal. In some cases the capacitor banks provided in the transmission system are switched off to reduce this effect. There can be necessity to include large inductor banks to compensate this capacitance effect. So generating wind power in remote area catering insignificant loads in that region can cause such problems. This can also be taken care if one goes for DC power transmission. Utility company's load dispatch center control and Managing the demand vs. lower generation.

Hence the grid management and availability is becoming more and more important with the changes in technology of these new turbines.
It is possible when the local power consumption in the region drops and the power generated by wind power projects of the same region is more than what the transmission network can handle to transfer to other parts of the State. It is likely that planning didn't take care earlier this situation. It happens due to changes in the local power consumption scene, i.e., the industries loads getting reduced and in addition, the agricultural loads also reduce, when there is enough water due to rains.

A. S. Karanth
Email : askaranth@bharatforge.com
***CEO,** BF Utilities Ltd., Pune 411 036*

Energetic turn to wind power

By Christian Toto THE WASHINGTON

The answer, or at least a partial answer, to the country's energy woes may be blowin' in the wind.
Wind energy produces no emissions and is the ultimate renewable resource, but for now, it represents just a fraction of the nation's total energy production.

Wind power provides less than 1 percent of electricity in the United States, but last year, it represented the second-largest source of new power generation in the country, trailing new natural gas plants, according to the District-based American Wind Energy Association.

The group says more than 2,400 megawatts of power came from domestic wind-energy parks installed last year. That's enough to power more than 650,000 American homes for a year, on average. President Bush has predicted that wind energy someday will provide as much as 20 percent of the country's electrical needs.

Germany, Denmark and parts of Spain generate 10 percent to 25 percent of their electricity from wind power.

In the United States, wind power has humble roots.

Farmers in the first half of the 20th century used wind power to pump water, but its potential otherwise remained untapped. The energy crisis of the 1970s bolstered interest, and the recent fighting in the Middle East could mean wind power will enjoy another boost in interest and research.

Steve Fetter, dean of the University of Maryland's School of Public Policy, defines wind power as "extracting the energy out of the moving air through the same aerodynamic forces that give airplanes lift."
A wind-park turbine transforms the kinetic energy from the spinning blades into electrical energy. The machines operate with either a vertical axis or a horizontal axis. The former is the more popular form; the latter looks like a helicopter's propeller system.
A wind park can't be built just anywhere. Mr. Fetter says the location ideally will have steady high-velocity winds.

"The amount of power is proportional to the cube of velocity. Double the wind speed, increase by a factor of eight the power in the wind," he says. "So it's important to find sites with high wind speed for a good fraction of the total number of hours."
Coastal sites, with their unobstructed terrain, generally provide good settings for wind parks. Sites for two parks are being explored on the East Coast. The first would create a 40-turbine, eight-mile park southeast of Long Island's Jones Beach; the other is being proposed off the coast of Cape Cod.

Source: http://washingtontimes.com

State-wise break-up of the capacity addition (In the order of capacity addition)

State	Capacity Addition (MW)
Tamil Nadu	255.62
Maharashtra	240.40
Karnataka	102.85
Gujarat	37.45
Rajasthan	27.75
Madhya Pradesh	12.65
West Bengal	0.50
Andhra Pradesh	Nil
Kerala	Nil

during the period from April 2006 to September 2006

State-wise Generation Data (kWh) From Wind Power Projects

S.No.	State	Million Units
1	Andhra Pradesh	1739.51
2	Gujarat	1613.04
3	Karnataka	2290.95
4	Kerala	15.86
5	Madhya Pradesh	237.95
6	Maharashtra	3227.34
7	Rajasthan	93.25
8	Tamil Nadu	15381.13
9	West Bengal	1.65
	Total	24600.68

As on 31st March 2006

Floating Ocean Windmills Designed to Generate More Power

Floating Ocean Windmills Designed to Generate More Power Ker Than LiveScience Staff Writer LiveScience.com
Windmills that would float hundreds of miles out at sea could one day help satisfy our energy needs without being eyesores from land, scientists said today.

Offshore wind turbines are not new, but they typically stand on towers that have to be driven deep into the ocean floor. This arrangement only works in water depths of about 50 feet or lessclose enough to shore that they are still visible.

Researchers at the Massachusetts Institute of Technology and the National Renewable Energy Laboratory (NREL) have designed a wind turbine that can be attached to a floating platform. Long steel cables would tether the corners of the floating platform to a concrete-block or other mooring system on the ocean floor, like a high-tech ship anchor. The setup is called a "tension leg platform," or TLP, and would be cheaper than fixed towers.

"You don't pay anything to be buoyant," said Paul Sclavounos, an MIT professor of mechanical engineering and naval architecture who was involved in the design.

The floating platforms to sway side to side but not bob up and down. Computer simulations suggest that even during hurricanes, the platforms would shift by only about three to six feet and that the bottom of the turbine blades would revolve well above the peak of even the highest wave. Dampers similar to those used to steady skyscrapers during high winds and earthquakes could be used to further reduce sideways motion, the researchers say.

Like the offshore windmills currently in use, the TLP's would use undersea cables to shuttle the electricity to land.

The researchers estimate their floater-mounted turbines could work in water depths ranging from about 100 to 650 feet. This means that in the northeastern United States, they could be placed about 30 to 100 miles out at sea. Because winds are stronger farther offshore, the floating windmills could also generate more energy5.0 megawatts (MW), compared to 1.5 MW for onshore units and 3.5 MW for conventional offshore setups.

To save money, assembly of the TLP's could be done onshoreprobably at a shipyardand towed out to sea by a tugboat, the researchers say.

Sclavounos estimates that building and installing the TLP's should cost a third of what it costs to install current offshore tower windmills. Another advantage of using floating platforms is that the windmills could be moved around. If a company with 400 wind turbines in Boston needs more power in New York City, it can unhook some of their windmills and tow them south.
The researchers plan to install a half-scale prototype of their invention south of Cape Cod.

"We'd have a little unit sitting out there to show that this thing can float and behave the way we're saying it will," Sclavounos said.

Source: http://windenergynews.blogspot.com

We need wind power to fight global warming

Wind power has become a vexing issue in Maine, as it has elsewhere in the country. Last week, voters in Freedom who were in favor of building a three-tower wind energy project on Beaver Ridge outnumbered opponents two to one. While the vote was not binding, wind power developers Competitive Energy Company of Portland had said they would not build their project in a town whose residents did not want them. The tide was decidedly in the opposite direction when a day earlier, the Land Use Regulation Commission allowed a number of organizations opposed to a western Maine wind farm to intervene in their consideration of a permit for that project. The groups include Maine Audubon, the Appalachian Mountain Club and other environmental organizations; they say the region's ridgelands are the wrong place for the development, where they claim it poses threats to rare plants and animals as well as to the scenic quality of the landscape. The conflicts over wind power development here mirror similar conflicts over construction of a large wind farm in Nantucket Sound as well as other projects in Vermont and Maryland. In many of these cases, the battles resemble internecine warfare as one group of environmentalists is pitted against another. One camp says, "These projects will kill important species, make too much noise and scar the view," while the other side says, "There won't be any animals left for you to defend if we don't do something to stop global warming." There is a difference between a project like Freedom's and a project like the one in the Western Mountains of Maine. Freedom's development includes three turbines; the other one calls for 30 turbines. One is virtually a backyard development; the other is an industrial-level project that will affect an entire region. We believe both are necessary. The evidence is mounting that global warming poses a critical threat to our planet's wellbeing and that its effects are likely already being felt. The migration routes of animals have been altered, which may affect their survival; glaciers are melting; our weather is changing. We need to take measures now to stem global warming's progress; wind power offers a way to do that. In the best of all possible worlds, this country would conserve its way out of our addiction to burning fossil fuels, which is the largest human contribution to global warming. We would discourage consumption and heavily subsidize the development of alternative, non-polluting energy sources. We'd have a president who set an example for all of us, who wore sweaters instead of turning up the heat and whose motorcade consisted entirely of hybrid cars and not gas guzzling SUVs. Yet we must act long before that dream becomes a reality. Wind power must be a significant element in our fight to counter the effects of global warming. We cannot and should not fight every development, in a war of attrition that will ultimately discourage the use of this important alternative energy source. We understand the feelings of those who lament the loss of a beautiful view, the potential damage to wildlife species and the industrialization of a largely untouched landscape. But not developing wind power carries an even higher price, a price we should not be forced to pay while we argue over the one place in this state where we might be willing to place a turbine.

Source: http://www.mainetoday.com

For more information

CENTRE FOR WIND ENERGY TECHNOLOGY
Velachery - Tambaram Main Road,Pallikaranai,
Chennai - 601 302. Phone: +91-44-2246 3982,
2246 3983, 2246 3984 Fax: +91-44-2246 3980
E-mail: info@cwet.res.in ,Web: www.cwet.tn.nic.in

Published by

CENTRE FOR WIND ENERGY TECHNOLOGY (C-WET)
An autonomous R&D institution established by the ministry of Non-conventional Energy Sources (MINES), Government of India to serve as a technical focal point of excellence to foster the development of wind energy in the country

If you would like to continue receiving the PAVAN newsletter, kindly send a request for registration to the address mentioned above (or) kindly send back the duly filled feedback form.